CLAIMS

1. A disk apparatus comprising:

a first disk rotating mechanism for rotating a first disk mounted thereon, with data being recordable on and/or reproducible from the first disk using a first light beam;

a first optical head for emitting the first light beam and performing recording and/or reproducing with respect to the first disk;

a first optical head moving mechanism for moving the first optical head substantially in a radial direction of the first disk;

a second disk rotating mechanism for rotating a second disk mounted thereon, with data being recordable on and/or reproducible from the second disk using a second light beam;

a second optical head for emitting the second light beam and performing recording and/or reproducing with respect to the second disk;

a second optical head moving mechanism for moving the second optical head substantially in a radial direction of the second disk;

a transfer base on which the first disk rotating mechanism, the first optical head, the first optical head moving mechanism, the second disk rotating mechanism, the second optical head and the second optical head moving mechanism are mounted;

a media tray conveyed to a first tray position for performing recording and/or reproducing with respect to the first disk, a second tray position for performing recording and/or reproducing with respect to the second disk and a third tray position for mounting and removing the first disk and the second disk;

a first tray guide for guiding the media tray in a first direction that is parallel with a surface of the first disk and a surface of the second disk and substantially is orthogonal to a straight line connecting a center of rotation of the first disk rotating mechanism and a center of rotation of the second disk rotating mechanism;

a second tray guide for guiding the media tray in a second direction that is parallel with the surface of the first disk and the surface of the second disk and parallel with the straight line connecting the center of rotation of the first disk rotating mechanism and the center of rotation of the second disk rotating mechanism;

a first tray driving mechanism for moving the media tray in the first

direction; and

a second tray driving mechanism for moving the media tray in the second direction;

wherein the first optical head and the second optical head are disposed on the same side with respect to a plane including a surface of a disk mounted on the media tray.

2. The disk apparatus according to claim 1, wherein the first tray position, the second tray position and the third tray position are in substantially the same plane.

3. The disk apparatus according to claim 1, wherein the second tray driving mechanism comprises at least one component capable of receiving a driving force from an external driving source.

4. The disk apparatus according to claim 1, wherein the transfer base is displaced toward and away from the disk mounted on the media tray.

5. The disk apparatus according to claim 1, wherein the transfer base is divided into a first transfer base on which the first disk rotating mechanism, the first optical head and the first optical head moving mechanism are mounted and a second transfer base on which the second disk rotating mechanism, the second optical head and the second optical head moving mechanism are mounted.

6. The disk apparatus according to claim 5, wherein the first transfer base and the second transfer base independently are displaced toward and away from the disk mounted on the disk tray.

7. The disk apparatus according to claim 6, further comprising a first lifting and lowering plate having a cam groove and moving in a direction substantially parallel with the second direction, and a second lifting and lowering plate having a cam groove and moving in the direction substantially parallel with the second direction,

wherein the first lifting and lowering plate and the second lifting and lowering plate respectively move in the direction substantially parallel with the second direction, thereby causing the respective cam grooves to displace

the first transfer base and the second transfer base toward and away from the disk mounted on the disk tray.

8. The disk apparatus according to claim 7, further comprising

a first lifting and lowering rack and a second lifting and lowering rack that are provided respectively in the first lifting and lowering plate and the second lifting and lowering plate and have a pitch line in the direction substantially parallel with the second direction, and

a lifting and lowering gear that engages with the first lifting and lowering rack and the second lifting and lowering rack and moves the first lifting and lowering plate and the second lifting and lowering plate in the direction substantially parallel with the second direction.

9. The disk apparatus according to claim 8, wherein the first lifting and lowering rack is an intermittent rack having a first unmating region that does not engage with the lifting and lowering gear, and

the second lifting and lowering rack is an intermittent rack having a second unmating region that does not engage with the lifting and lowering gear.

10. The disk apparatus according to claim 9, further comprising an engagement switching mechanism that is driven by the movement of the first lifting and lowering plate so as to control the engagement between the second lifting and lowering rack and the lifting and lowering gear and driven by the movement of the second lifting and lowering plate so as to control the engagement between the first lifting and lowering rack and the lifting and lowering gear.

11. The disk apparatus according to claim 8, wherein the pitch line of the first lifting and lowering rack and that of the second lifting and lowering rack face each other with the lifting and lowering gear interposed therebetween.

12. The disk apparatus according to claim 10, wherein the first lifting and lowering plate comprises a substantially L–shaped first switching cam groove formed of a first straight portion that is substantially parallel with the second direction and a first orthogonal portion that is connected at right angles with the first straight portion,

the second lifting and lowering plate comprises a substantially L–shaped second switching cam groove formed of a second straight portion that is substantially parallel with the second direction and a second orthogonal portion that is connected at right angles with the second straight portion,

the engagement switching mechanism comprises a switching lever including a first pin that mates with the first switching cam groove and a second pin that mates with the second switching cam groove, and

the switching lever is rotatable around an axis that is equidistant from the first pin and the second pin.

13. The disk apparatus according to claim 12, wherein the second pin mates with the second straight portion only when the first pin mates with the first orthogonal portion, and

the first pin mates with the first straight portion only when the second pin mates with the second orthogonal portion.

14. The disk apparatus according to claim 12, wherein the lifting and lowering gear engages with the first lifting and lowering rack only when the first pin mates with the first straight portion, and

the lifting and lowering gear engages with the second lifting and lowering rack only when the second pin mates with the second straight portion.

15. The disk apparatus according to claim 7, further comprising

a first lifting and lowering rack and a second lifting and lowering rack that are provided respectively in the first lifting and lowering plate and the second lifting and lowering plate and have a pitch line in the direction substantially parallel with the second direction,

a first lifting and lowering gear that engages with the first lifting and lowering rack and moves the first lifting and lowering plate in the direction substantially parallel with the second direction, and

a second lifting and lowering gear that engages with the second lifting and lowering rack and moves the second lifting and lowering plate in the direction substantially parallel with the second direction.

16. The disk apparatus according to claim 1, wherein the second tray

driving mechanism comprises

a driving source, and

a gear train for transmitting a driving force obtained by the driving source.

17. The disk apparatus according to claim 1, wherein the second tray driving mechanism comprises

a gear for transmitting a driving force,

a conveying rack that engages with the gear and moves in a direction parallel with the second direction,

a conveying rack pin provided in the conveying rack,

a conveying and driving lever that is held rotatably, and

a conveying cam groove that mates with the conveying rack pin and is provided in the conveying and driving lever along a radial direction with respect to an axis of rotation of the conveying and driving lever, and

the conveying rack is moved to rotate the conveying and driving lever, causing the first tray guide that mates directly or indirectly with a part of the conveying and driving lever to be driven along the second direction.

18. The disk apparatus according to claim 17, wherein the conveying cam groove has a substantially "Y" shape bifurcating on a side away from the axis of rotation.

19. The disk apparatus according to claim 1, wherein at least one of the first disk and the second disk is contained in a case–like disk cartridge.

20. The disk apparatus according to claim 19, wherein the disk cartridge has an opening for exposing the contained disk and a first cartridge shutter and a second cartridge shutter for opening and closing the opening, and

the first cartridge shutter and the second cartridge shutter respectively rotate so as to change a distance therebetween, thereby opening and closing the opening.

21. The disk apparatus according to claim 20, wherein an operation of opening and closing the opening by the first cartridge shutter and the second cartridge shutter is carried out together with moving the media tray along the first direction.

22. The disk apparatus according to claim 20, wherein a surface of the first tray guide substantially parallel with the first direction is provided with an opening and closing member for opening and closing the opening.

23. The disk apparatus according to claim 22, wherein a side of the first tray position with respect to the second tray position is the same as a side of the opening and closing member with respect to a direction that passes through a center of the disk contained in the disk cartridge and is parallel with the first direction.

24. The disk apparatus according to claim 1, further comprising a movable side positioning portion provided in the first tray guide and a fixed side positioning portion whose position relative to the second tray guide is constant,

wherein when the first tray guide is moved along the second direction, the movable side positioning portion contacts the fixed side positioning portion at a terminal end of a moving direction, thus positioning the first tray guide in the second direction.

25. The disk apparatus according to claim 1, further comprising a fixed side positioning portion whose position relative to the second tray guide is constant,

wherein when the media tray on which a disk cartridge containing the first disk or the second disk is mounted is moved along the second direction, the disk cartridge contacts the fixed side positioning portion at a terminal end of a moving direction, thus positioning the disk cartridge in the second direction.

26. The disk apparatus according to claim 1, wherein the first tray guide is provided with a common clamper unit that allows the first disk to be held firmly on the first disk rotating mechanism and allows the second disk to be held firmly on the second disk rotating mechanism.

27. The disk apparatus according to claim 1, wherein a mounting surface of the first disk in the first disk rotating mechanism and a mounting surface of the second disk in the second disk rotating mechanism have substantially

the same height.

28. The disk apparatus according to claim 1, wherein a terminal position to which the media tray moves from the third tray position along the first direction is the first tray position.

29. The disk apparatus according to claim 1, wherein a distance between the center of rotation of the first disk rotating mechanism and the center of rotation of the second disk rotating mechanism is 0.9 to 1.1 times a dimension obtained by adding a radius of the first disk and a radius of the second disk.

30. The disk apparatus according to claim 1, further comprising a mechanical base on which the media tray, the first tray guide, the second tray guide, the first tray driving mechanism and the second tray driving mechanism are mounted,

wherein the transfer base is attached to the mechanical base via a damper for absorbing a vibration.

31. The disk apparatus according to claim 5, further comprising a mechanical base on which the media tray, the first tray guide, the second tray guide, the first tray driving mechanism and the second tray driving mechanism are mounted,

wherein the first transfer base and the second transfer base respectively are attached to the mechanical base via a first damper and a second damper for absorbing a vibration that have different vibration characteristics.

32. The disk apparatus according to claim 1, further comprising a mechanical base on which the media tray, the first tray guide, the second tray guide, the first tray driving mechanism and the second tray driving mechanism are mounted,

wherein the mechanical base is held by a chassis of the disk apparatus via a mechanical base damper for absorbing a vibration.

33. The disk apparatus according to claim 19, wherein the disk cartridge is provided with at least one hole,

the transfer base is provided with a positioning pin that is fitted in

the hole provided in the disk cartridge, and

the fitting between the hole and the positioning pin allows the disk cartridge to be positioned with respect to the first disk rotating mechanism or the second disk rotating mechanism.

34. The disk apparatus according to claim 33, wherein a basal portion of the positioning pin is provided with a seating that contacts a surface of the disk cartridge.

35. The disk apparatus according to claim 34, wherein a positioning pin hole through which the seating is passed is formed on a surface of the media tray on which the disk cartridge is mounted.

36. The disk apparatus according to claim 35, wherein the seating is passed through the positioning pin hole when the first disk or the second disk is mounted on the first disk rotating mechanism or the second disk rotating mechanism.

37. The disk apparatus according to claim 35, wherein a clearance of 0.2 to 1.5 mm is provided between an inner peripheral surface of the positioning pin hole and an outer periphery of the seating.